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custom in the eastern states, for just recently, August 19, 1911, I observed on the Herke ranch in Parker Bottom a dove's nest on a horizontal limb of a willow and another, from which the young had just flown, on a horizontal apple limb. But as is the case with the robins they build in unusual places as well. The ordinary place to find doves' nests on this ranch is on the flat top of a vineyard post, where the nest is nicely shaded and screened from view by the grape leaves.

Two such nests were found in 1910, one of which is shown in the accompanying illustration (fig. 55), and two have been found this season, 1911. In all four cases the nests were well built for doves' nests, and the young were reared.

The second illustration (fig. 56) shows a dove's nest on the ground. This nest was at the edge of an alfalfa field just above the perpendicular side of a narrow ravine, the parent doves alighting and leaving from the brink of the bank. Sage brush rubbish had been scraped to this side of the field in clearing it, and in this half decomposed trash the doves had made for a nest merely a slight depression, apparently having brought nothing in the way of material to the nesting site. This nest was discovered on June 15, 1910, when the young were apparently but two or three days old. They left the nest on June 23.

It seems hardly probable that these birds, particularly the robins, which differ in other characters from their eastern relatives, should ever, even with the changed environment of irrigation, become as rigidly tree nesting as their eastern relatives.

However, it will be interesting to observe how these desert robins and doves will adapt their nesting habits to the coming change of environment.

## NESTING NOTES ON THE DUCKS OF THE BARR LAKE REGION, COLORADO

By ROBERT B. ROCKWELL

### PART II

WITH TEN PHOTOS

#### PINTAIL (*Dafila acuta*)

THE effect of irrigation and land cultivation upon the distribution of bird life, was clearly illustrated by our field work among the Pintails. Cooke's "Birds of Colorado" published in 1897 classified the Pintail as a "rare summer resident", with the qualifying statement that it usually bred from the northern states northward. This statement was no doubt largely correct, when it was published, but ten years' time, with the accompanying development of large reservoir and canal systems, and the cultivating of thousands of acres of fertile land, has wrought a decided change in this condition. Upon the beginning of our work\* along the Barr Lakes in 1906, we found the Pintail very much in evidence throughout the spring and summer, and their nests were found in greater numbers than those of any other species of duck except the Blue-winged Teal.

It was a difficult matter to reconcile ourselves to the fact that the extremely shy, wild and racy birds that eluded our carefully placed and concealed blinds, and

\* The notes upon which this paper is based were taken in company with Mr. L. J. Hersey.

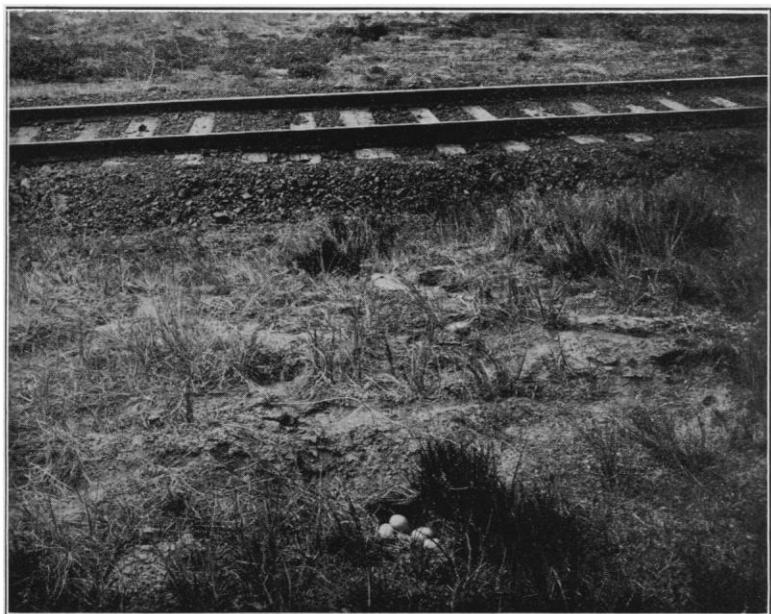


Fig. 57. NEST OF PINTAIL WITHIN 18 FEET OF MAIN LINE OF BURLINGTON ROUTE



Fig. 58. A CLOSER VIEW OF THE PINTAIL'S NEST CLOSE TO RAILROAD TRACKS

kept just out of gunshot with an accuracy that was almost uncanny during the spring shooting season, could, in a few short weeks, be converted into the comparatively tame and unsuspicious birds that the nesting female Pintails proved to be. Yet the sleek, well dressed male with his conspicuous white waistcoat and brown head was at all times wary and difficult to approach, and very few times did we approach to within gunshot of him, although his solicitude for his mate and the nest was quite apparent.

We found nests of the Pintail in widely diversified locations but there was a peculiar similarity noticeable in all of them which was very different from our experience with the teal.

The first nest, found May 11, 1907, was probably the most unusually located nest of the Pintail on record.

It was just a trifle less than eighteen feet from the rails of the main line of the Burlington Route, over which a dozen or more heavy trains thundered every day, and well within the railroad right-of-way where section hands and pedestrians passed back and forth continually. The mother bird had found a cavity in the ground, about eight inches in diameter and eight inches deep, and had lined it with grass; and the two fresh eggs which it contained on this date were deposited without any downy lining whatever. The female flushed as we passed along the track about twenty feet distant, thus attracting our attention. A week later (on the eighteenth) the nest was fairly well lined with down and contained nine eggs, one egg having apparently been deposited each day. On May 24 the nest contained eleven eggs and the parent was

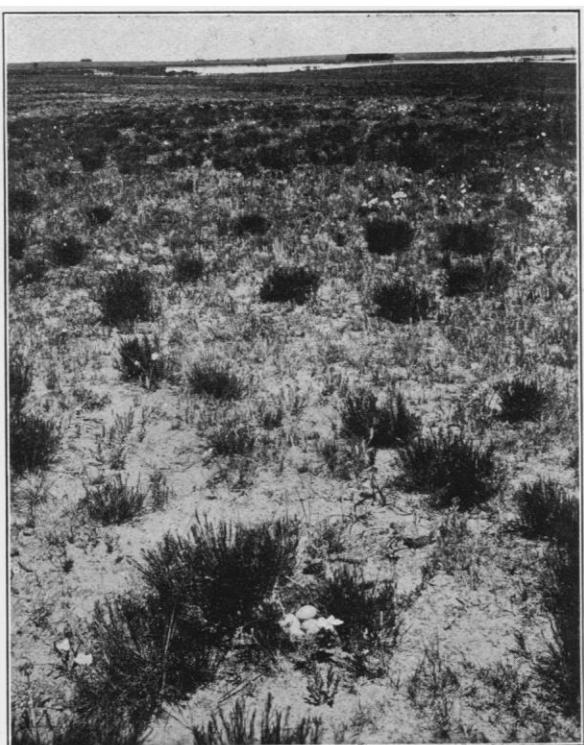


Fig. 59. PINTAIL'S NEST ON HIGH PRAIRIE A NEARLY MILE FROM NEAREST WATER

much tamer than on the two preceding visits, allowing us to approach to within fifteen feet of her, and alighting within twenty yards of us upon being flushed.

Another peculiar nest was found May 30, 1908, containing eleven eggs which hatched during the first week in June. This nest was a depression in a perfectly bare sandy flat without a particle of concealment of any kind. The cavity was located in the most exposed position within hundreds of yards, and was fairly well lined with weed-stems, grass, etc., and well rimmed with down. The brooding female was very conspicuous against the back-ground of bare sand, and could be readily seen from a distance of fifty feet or more. This bird was rather wild and flushed while we were yet some distance from the nest.



Fig. 60. BULL-SNAKE ROBBING PINTAIL'S NEST



Fig. 61. NESTING SITE AND NEST OF REDHEAD

Several nests were found far back on the dry prairie and high above the high-water mark, one being almost a mile from the lake. These nests were usually well concealed in the weeds, and were warmly lined with down of a somewhat darker shade than that found in the teals' nests. The birds were close sitters, often allowing us almost to step upon them before taking wing. The generous lining of down which was found in nearly all the nests was almost invariably used to cover the eggs during the absence of the parent, and many nests that had little or no concealment were difficult to locate after having been cunningly concealed by the mother duck, even though we knew almost the exact location. The bulky mass of down was pushed outward and upward when the bird was on the nest until it came well up about her body, but this very thing made the nests much more conspicuous when the birds were flushed unexpectedly, without sufficient time to



Fig. 62. MIXED NEST CONTAINING FIVE EGGS OF RUDDY AND FIVE OF REDHEAD

cover the eggs. One typical nest was found May 31, 1908 deeply sunk in a dense growth of very tall, rank grass on a small island in the lake, which would not have been discovered but for this fact.

On June 8, 1907 a nest was found under a spreading bunch of alfalfa on a small ridge in a low marshy meadow. On June 22, it contained nine eggs. The brooding female was unusually tame, and repeated attempts were made to photograph her, several of which were nearly successful. June 29 the female was still incubating but the nest contained only five eggs. The next day we found it occupied by a bull snake three feet nine inches in length, which had just swallowed an egg, only two of which now remained in the nest. It took the snake some time to force the unbroken egg (which was somewhat larger than its own body) down its throat about three inches, and it was regurgitated instantly upon our touching the

snake with a stick. Upon dissecting it we found no signs whatever of the other eggs, a fact which raised the question as to whether the two which had disappeared since the preceding day had been entirely digested (shell and all) within that time, or whether more than one snake was pilfering this particular nest. A fortunate exposure caught the egg just as it was being disgorged from the snake's mouth.

Eight to eleven eggs apparently constitute full sets, and ten was the average number found, but one nest was found containing five heavily incubated eggs, which hatched July 6, 1908. The earliest nest found during the three seasons was May 11; the first egg in this set was probably laid May 9. The average date for complete sets was the last week in May, and many of the eggs hatched during the first week in June.

Broods of young birds were kept well concealed by the parents until able to



Fig. 63. NESTING SITE OF RUDDY AND CANVASBACK. THIS MUSKRAT HOUSE CONTAINED AT THE SAME TIME TWO NESTS OF THE RUDDY AND ONE OF THE CANVASBACK

care for themselves. We saw but two or three broods, but in each case the mother was very bold, using every possible subterfuge to lead us away from her babies.

#### REDHEAD (*Marila americana*)

Cooke, in the second supplement to "Birds of Colorado," published in 1900, states that "facts are accumulating which make it probable that this species will in the near future be accounted among the breeding birds of Colorado," and this prediction was fully verified by our discovery of several nests during 1906, 1907 and 1908. Five nests were found which we could positively attribute to the Redhead, and a few others which in all probability belonged to this species, but which we were unable to identify beyond doubt. Further than this enough pairs of Redheads as well as single males in full breeding plumage were seen during May, June and July of each of these years to satisfy us that the birds were breeding along

the Barr chain of lakes in goodly numbers, and that the few nests examined by us were but a part of the total number.

The Redheads' nests, like those of the teal, exhibited a wide variation in structure and location. The first two nests were found June 10, 1906. These, containing five fresh eggs and nine incubated eggs, respectively, were within two feet of each other, in burrows in the top of a large musk-rat house at the edge of a small lake, in a sparse growth of cat-tails. The birds had burrowed in about eighteen inches, lined the cavity with down, and deposited the eggs at the end of the cavity. A careful examination of all the musk-rat houses seen (and they were so conspicuous that in all probability none was overlooked) during the balance of 1906 and the full nesting seasons of 1907 and 1908, failed to reveal any other similarly located nests of this species.



Fig. 64. NEST AND EGGS OF CANVASBACK IN BURROW IN SIDE OF MUSKRAT HOUSE

On May 31, 1907, we found a beautiful set of eleven fresh eggs in a large, bulky nest somewhat resembling an overgrown nest of the coot, but much less compact and not so neatly cupped or lined as the average coot's nest. There was little or no downy lining in the nest which was built in an average growth of cat-tails over about eighteen inches of water, and some twenty yards from the open water of the lake. There was no apparent attempt at concealment, and it was very conspicuous owing to its large size. The female flushed wildly, with a good deal of noise, when we were fully forty yards from the nest thus attracting our attention to it. Eight of these eggs hatched on or about June 20, the remaining three being addled.

The finest nest of this species which came to our attention was found June 15, 1907, in a dense cat-tail swamp between two small rush-encircled lakes. It was a beautifully built structure of dead cat-tail blades, mostly broken into small pieces, well built up above the surface of the water (which at this spot was only a few inches deep), deeply cupped, plentifully lined with down, and well concealed in the dense cat-tail growth. This set hatched on or about June 30. A photo of this nest appeared in the July, 1909, *CONDOR*.

Within about fifty yards of the nest found May 31, on June 8 we found one built in the midst of a solitary clump of cat-tails, containing two eggs of the Red-head and four of the Ruddy Duck. This was made entirely of dead cat-tails, and built in such a manner that the cat-tail clump entirely surrounded and covered it,



Fig. 65. NEST AND EGGS OF RUDDY IN BURROW IN SIDE OF MUSKRAT HOUSE

affording good concealment. A week later this nest contained two Redhead's eggs and six eggs of the Ruddy, and on June 22, it contained five eggs of each. Whether this nest belonged to a brooding Redhead or a Ruddy the most careful stalking did not reveal, as the bird invariably skulked off through the dense cover before we were able to identify it.

The peculiar manner in which eggs of more than one species were deposited in the same nest was a feature of special interest to us, and we tried persistently to unravel the mystery; but although we tried many different methods, we were unable except in one instance, to flush the parent bird from any of the nests containing mixed sets. In fact we did not flush any Ruddys or Redheads from nests except in the one case mentioned above.

CANVASBACK (*Marila valisineria*)

Probably the most important feature of our field work at Barr was that of establishing beyond question, the Canvasback, as a Colorado breeder. Although we made a special effort throughout the three seasons to locate nests of this species, one was all that we discovered, and judging from the few ducks seen, as compared with the number of individuals of the other species, we were no doubt very fortunate in finding the one nest.

On May 31, 1907 we found a fine set of ten Ruddy's eggs in an excavation in the side of a large musk-rat house. Upon returning to this nest on June 8, we found another and newer nest in the same musk-rat house containing eight fresh eggs of the Canvasback. This was also an excavation in the side of the house, much deeper than that of the Ruddy (the eggs being fully eight inches from the



Fig. 66. NEST AND EGGS OF RUDDY IN EXPOSED POSITION ON TOP OF MUSKRAT HOUSE

entrance), and higher above the water line. The cavity was fairly well lined with white down, quite a quantity of which was also scattered about the entrance of the burrow. A week later (June 15) the full complement of fourteen eggs had been deposited, and covered with a thick layer of down. The female was surprised not far from the nest and afforded us a splendid opportunity for identification. These eggs hatched on or about July 6.

RUDDY DUCK (*Erismatura jamaicensis*)

Judging from the numbers of Ruddy Ducks seen throughout the three seasons on all the smaller marshy lakes, we should have found them nesting in considerable numbers, but three nests and a mixed set was the best that we could do.

The first, which has been mentioned above in connection with that of the Canvasback, was a mere burrow in the side of the musk-rat house, without any downy lining whatever, and only a few inches above the water level. On May 31 it contained ten eggs, on June 8, eleven, two of which were Canvasback's or Redhead's; and on June 30 all but two Ruddy's and one other egg had hatched, although one duckling had died while hatching.

Meanwhile on June 8, the Canvasback's nest was found on the opposite side of the musk-rat house and about four feet from it; and a new Ruddy's nest containing three fresh eggs was found on top of the house, and about midway between the other two nests and somewhat higher up. This was a mere unlined depression in the litter composing the house, entirely without concealment of any kind, and the great snowy white eggs could be seen from a distance of many yards. On June 22 the nest contained eight eggs, and on June 30 the set had not yet hatched.

The third nest, found June 15, 1907, hardly deserved the dignity of the term. It was merely a depression formed by trampling a tuft of tender marsh grass down to form a flimsy platform just at water level in a dense cat-tail swamp between two small lakes. When found it was over about two inches of water, and the under sides of the eleven fresh eggs were wet. A week later the water in the swamp had risen slightly and the nest was deserted. This was about ten yards from the nest containing thirteen Redhead's eggs mentioned above, and three of the eleven eggs it contained were indistinguishable from eggs in the Redhead's nest.

In all our visits to these three nests we did not see the birds leave a single time, although they sometimes swam about in front of us, some distance out on the lake. The apparent indifference of the brooding Redheads, Ruddys and Canvasbacks was in marked contrast to the devotion of the Teal and Pintails to their nests; and is very difficult to understand when the characteristic timidity of the last named species during the migration period is taken into consideration.

## THE RELATION OF BIRDS TO AN INSECT OUTBREAK IN NORTHERN CALIFORNIA DURING THE SPRING AND SUMMER OF 1911\*

By HAROLD C. BRYANT

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WITH FOUR PHOTOS BY THE AUTHOR

AS THE study of the economic relation of birds becomes more and more important, any information as to their use as checks in an outbreak of injurious insects furnishes data of pertinent value. If it can be proved that birds flock to places where insects are abundant or even that the resident birds feed largely on those at any time most obtainable, their service as checks on outbreaks of injurious insects will be established.

Professor S. A. Forbes in 1883 made a study of the relation of birds to an outbreak of cankerworms in an apple orchard in Illinois. The orchard was visited for two successive seasons and a number of the different species of birds present

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\* This paper is a report of work done in connection with the investigation into the food habits of California birds in their relation to agriculture. This investigation is being carried on by the California State Board of Fish and Game Commissioners, and the present report is published with their permission.